F. H. COOK.

SCREW CUTTING DIE.

APPLICATION FILED MAR. 25, 1909.

1,053,158. Patented Feb. 18, 1913.

Fig. 1.

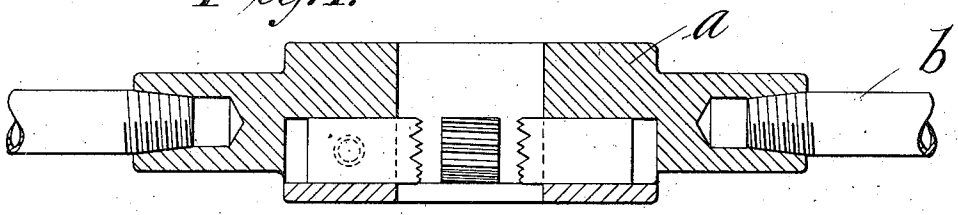


Fig. 2.

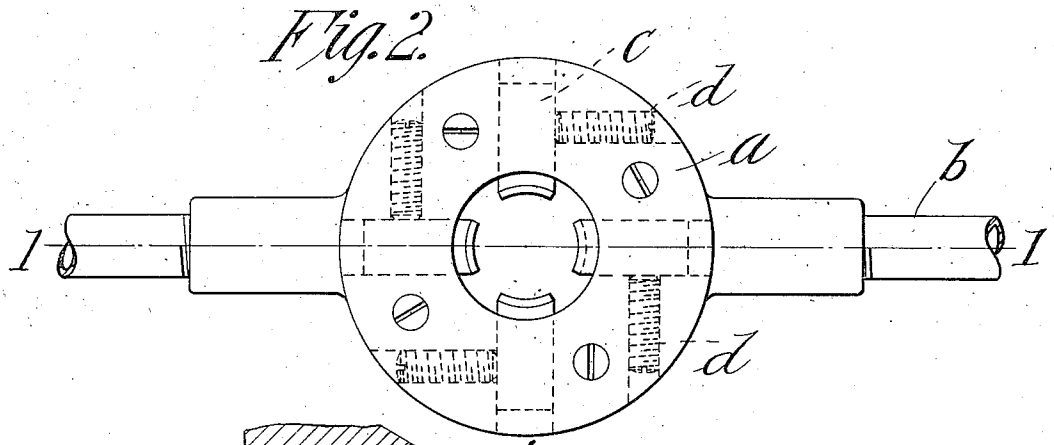
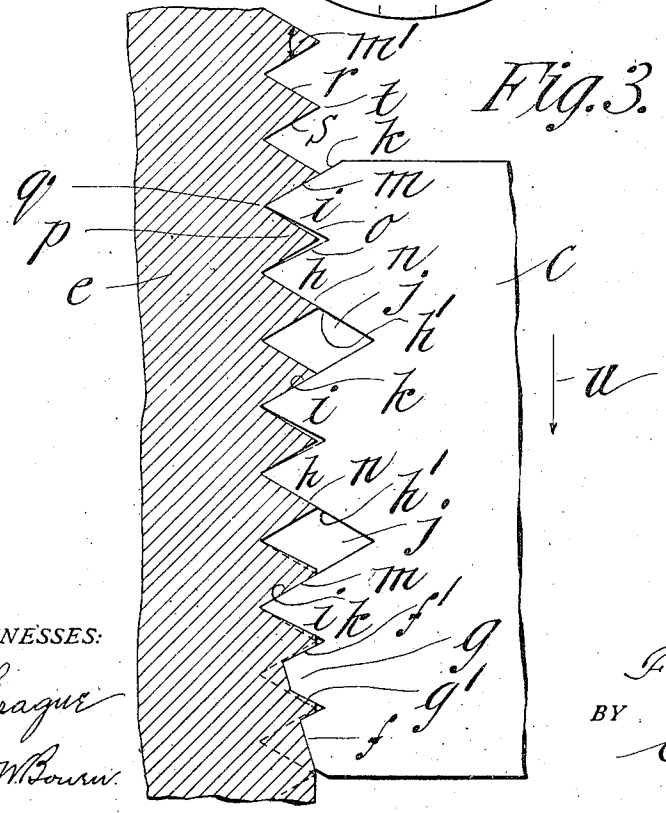


Fig. 3.



WITNESSES:

H. K. Sprague

Harry W. Bowen

INVENTOR.

Frank H. Cook.

BY

Chapin & Co.

ATTORNEY.

UNITED STATES PATENT OFFICE.

FRANK H. COOK, OF GREENFIELD, MASSACHUSETTS.

SCREW-CUTTING DIE.

1,053,158. Specification of Letters Patent. Patented Feb. 18, 1913.

Application filed March 25, 1909. Serial No. 485,749.

To all whom it may concern:

Be it known that I, FRANK H. COOK, a citizen of the United States of America, residing at Greenfield, in the county of Franklin and State of Massachusetts, have invented new and useful Improvements in Screw-Cutting Dies, of which the following is a specification.

This invention relates to improvements in screw or thread-cutting dies.

Heretofore it has been the practice to employ two or more cutting dies in which the cutting teeth are arranged in staggered relation to each other, and wherein a chip is removed first from the side of one tooth which is being cut, and a second chip is removed from the other side of the tooth.

My invention has, as its objects,—(1) to provide a single land or die which will of itself, by reason of the shape of the cutting teeth, form a perfect thread; (2) to provide the land with a set of leading teeth so formed that the teeth thereof are on a sharper angle or greater incline than the finishing teeth; (3) to so arrange the finishing teeth that, preferably, every third tooth is omitted whereby space is provided for receiving the removed chips during the thread-forming process; (4) to effect the formation of the finished threads whereby the apex of each tooth is left clean and sharp, that is without any bur or rough edge.

Other objects and advantages will appear in the body of the specification and will be particularly pointed out in the claims.

In the drawings forming part of this application,—Figure 1 is a vertical sectional view on the line 1—1, Fig. 2, showing the cutting dies or lands arranged in the holding means. Fig. 2 is a plan view showing the arrangement of the cutting die in the holding stock and with the set screws for securing the same in place. Fig. 3 is an enlarged detail view illustrating the manner in which the cutting die is used.

Referring to the drawings in detail,—*a* designates the usual die-stock provided with the operating handles *b*.

c designates the cutting dies that are retained in the die-stock *a* by means of the set-screws *d*, for example, although other means may of course be employed for effecting the purpose.

Referring to Fig. 3: The work in which a thread is being cut is designated by *e* and is supposed to represent metal. The thread-cutting die *c*, it will be noticed, has at the forward end thereof two of its thread-cutting teeth *f* and *g*, cut away. These threads may be termed the leading teeth of the die, that is, they do not cut the full depth of the thread at once but merely block out, as it were, a path or track for the finishing teeth to follow. These teeth are formed with sharper sides or angles than the finishing teeth, as indicated at f^1 and g^1. The finishing teeth are shown at *h* and *i*, and *j* designates a space between two of these teeth, or in other words one of the finishing teeth is omitted.

Referring to the finishing tooth *i* of the cutting die: It will be noticed that its cutting edge *k* is removing a chip from the work, as shown at *m*, and the cutting edge h^1 of the following tooth *h* is removing a chip from the opposite side of the thread that is being cut, as shown at *n*. The angle between the cutting edges *k* and h^1 is of course the angle of the apex of the finished thread or the standard 60° as shown and designated at m^1. The angle between the cutting edges *k* and h^1 is the same as the space *j* which, as shown, is 60° or the same as the angle between the sides of the finished tooth, as shown at m^1, and equal to the linear dimension of two teeth. Further, it will be noticed that the angle between the non-cutting edges of the teeth *h* and *i* is less than the angle m^1 of the finished tooth, as shown at *o*. This formation of the die-cutting teeth therefore permits the root portion of the thread *p* which is being cut to be carefully cut, as shown at *q*. One of the functions of the space *j* of the die or land is to receive the chips that have been removed from the stock or work by the cutting edges *k* and h^1. It is obvious that as long as the removed metal is retained in the space *j* or chip-receiving receptacles, that they can not injure the finished surfaces *r* and *s*, or abrade the point *t* of the thread while being finished, thus leaving the thread that has been cut in the work clean and sharp on all of its surfaces.

The arrow *u* designates the direction in which the thread-cutting die *c* is moved, and it will be seen that several of the cutting teeth act on the work *e* for forming the finished threads.

A particular feature of this cutter lies in

the fact that by reason of the opening *j* for receiving the chips less friction or power is required to cut a thread than in the ordinary thread-cutting die, wherein all of the thread-cutting teeth are used at one time; and, further, from the fact that only one side of each tooth is being formed during the cutting operation.

Although I am aware that thread-cutting dies have heretofore been used in which opposite sides of the tooth are acted upon independently, I consider it new, as far as I am aware, to remove one of the cutting teeth for producing a chip-receiving receptacle for receiving the metal which has been removed during the cutting operation.

This improvement is equally applicable and valuable as a chaser to be used singly for cutting threads in a lathe; that is to say, a single land or chaser is a complete tool in itself, and can be used singly as a chaser or in sets, as a die. The same idea is also applicable to taps, particularly large sizes, where the lands are inserted in the body portion of the tool thereof. The thread-forming teeth *h* and *i* with the spaces *j* therebetween may be considered as being arranged in pairs.

What I claim, is:—

1. In a cutting tool of the class described, a single die, or land member, the cutting teeth of which are formed with angles of different pitch on their opposite sides, and the teeth being so arranged that a space equal to the linear dimension of two cutting teeth is formed between two successive teeth, the sides of the spaces being arranged at an angle equal to the finished teeth whereby a finishing chip is removed from the opposite sides of the adjacent teeth being cut.

2. A thread-forming tool having advancing teeth at the forward end thereof, and pairs of thread-forming teeth for removing a chip in succession from opposite sides of the thread being cut, said pairs of teeth being arranged so as to form an angular space between the thread-forming teeth, said tool comprising a single land or die member, one edge only of which is provided with thread-forming teeth.

3. A thread-forming tool having a single row of cutting teeth in the same plane, said teeth having their cutting edges arranged with an acute angular space therebetween so as to operate simultaneously on the opposite sides of adjacent threads which are being formed, and the angle between the cutting edges of the cutting-teeth being equal to the angle between the sides of the finished tooth.

4. A thread forming tool having cutting teeth, said teeth having cutting edges arranged so as to operate simultaneously on different threads in the same line which are being formed, the angle between the cutting edges of the cutting teeth being equal to the angle between the sides of the finished tooth, said cutting tool having its teeth arranged with an angular space therebetween the sides of which form an angle equal to the sides of the finished tooth, whereby a chip is simultaneously removed from two different teeth.

5. A thread-forming tool comprising a single row of cutting-teeth, the advancing end of the tool having mutilated teeth of less pitch than the tooth to be cut, the finishing teeth of the tool having an angle between two of its cutting-teeth that is less than the finished angle of the thread which is being cut, whereby the root portion of the thread is formed, and said cutting-teeth having their opposite sides formed as cutting edges that are formed with angles equal to the angles of the finished teeth of the thread.

6. A thread-cutting die having two pairs of cutting teeth, the angles of the outer sides of two teeth of each pair being formed to remove the finishing cut, the angle between the teeth in each pair of teeth being less than the finishing angle of a tooth at its apex, the adjacent cutting sides of the first mentioned angles of the two pairs of cutting teeth being prolonged so as to intersect in an angle that represents the angle at the apex of the finished tooth, whereby a space is formed between the two pairs of cutting teeth, and whereby the opposite sides of the adjacent teeth are cut in succession by the outer sides of each pair of teeth, substantially as described.

7. A thread forming die having its teeth located in the same plane and arranged in groups of two, the angle between the teeth in each group therebetween being less than the finished thread, and the spaces between the groups being equal to the linear dimensions of two teeth, the sides of these spaces being formed on angles equal to the angles of the finished thread, as described.

FRANK H. COOK.

Witnesses:
CHARLES L. COOK,
HENRY HIGINBOTHAM.